

Plant and Equipment Expenditures of U.S.-Owned Foreign Affiliates: Revised Estimates for 1972 and 1973

PLANT and equipment expenditures by U.S.-owned foreign affiliates are expected to increase 7 percent this year, following an estimated 2 percent increase in 1972. If current expectations are realized, expenditures in 1973 will total \$16.3 billion.¹

By industry, much of the growth in expenditures in both 1972 and 1973 is related to investments in petroleum, particularly for exploration and production facilities in Saudi Arabia and for expansion of tanker fleets. Plant and equipment spending by manufacturing affiliates in 1973 is expected to continue the slow growth of the past 2 years, while expenditures in mining and smelting are expected to rise slightly following a large reduction in 1972. Expenditures by affiliates in all other industries combined show continued strong growth but account for only a small portion of total spending.

These findings do not reflect the impact on spending plans of the February 1973 dollar devaluation but should reflect any effect of the dollar devaluation and realignment of foreign exchange rates resulting from the December 1971 Smithsonian Agreement. Attempts to identify the impact of the earlier realignment of exchange

rates on expenditures produced rather inconclusive results. (See the March and September 1972 issues of the SURVEY.)

Total spending in 1972 is now estimated to have been \$0.2 billion less than was projected 6 months ago; the projection of total spending in 1973 is unchanged (see table 1). The comparison between the "current" and "prior" estimates is affected by correction of two errors contained in the prior estimates. The corrections affected certain industry and country data for 1972 and

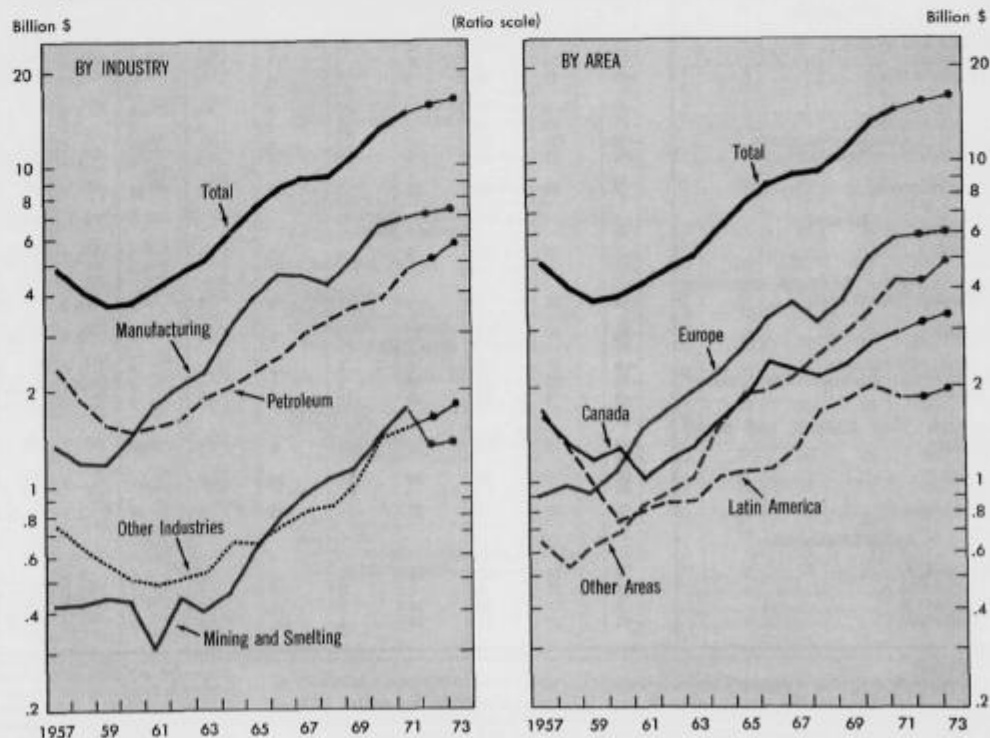
1973, although for each year their net impact on the total was negligible. Correction of the errors raised manufacturing expenditures in the United Kingdom approximately \$175 million in 1972 and \$200 million in 1973, while lowering outlays by mining affiliates in Australia about \$200 million in both years.

Area and industry patterns

The level of spending by affiliates in mining and smelting fell sharply to

CHART 14

Expenditures for Plant and Equipment by Foreign Affiliates of U.S. Companies



• Expected, see note table 1.

U.S. Department of Commerce, Bureau of Economic Analysis

NOTE.—Data for this article were prepared under the supervision of Howard Murad with a significant contribution from Thomas Becker.

1. These estimates are based on BEA's latest semiannual survey, taken in December 1972, covering a sample of about 450 U.S. direct investors and their 4,800 affiliates. They are universe estimates for all directly held affiliates in which U.S. equity interest is 25 percent or more.

\$118 billion in 1972 from \$1.7 billion in 1971. The drop was centered in Australia and Canada where large increases had occurred in 1970 and 1971, and may reflect completion of large expansion projects begun earlier. In addition, weakness in metal prices and sluggish demand, particularly in Europe, may have dampened the incentives for expansion. In 1973, capital spending by mining and smelting affiliates is expected to remain approximately at the 1972 level.

Expenditures by affiliates in *manufacturing* are expected to continue on the very modest growth path of the past 2 years. The total in 1973 is expected to reach \$7.3 billion, up from \$7.1 billion in 1972. By area, however, expansion shows a markedly different pattern in 1973 than in 1972. In

Canada, manufacturing affiliates increased their spending 21 percent in 1972 but expect only a small increase this year to a level of \$1.4 billion. In Europe, on the other hand, manufacturing outlays are estimated to have fallen last year but a 3-percent increase is planned for 1973, bringing total spending to \$3.9 billion. Substantial growth occurred in manufacturing outlays in Latin America last year and it is expected to continue into 1973 with total spending approaching \$1.0 billion.

The shift in spending patterns of Canadian and European manufacturing affiliates may be related to the timing of cyclical developments. Canada, like the United States, appears to have been ahead of most other developed countries in the business recovery. Relatively strong economic expansion is expected

in Europe this year, but the recovery does not yet seem to be fully reflected in affiliate spending plans.

In Latin America, for both 1972 and 1973, the growth in manufacturing expenditures more than offsets reductions in spending in the extractive industries (mining and petroleum). Expenditures by manufacturing affiliates will amount to almost half of total affiliate spending in Latin America in 1973, compared to only about one-third, on average, in 1967-71. Strong manufacturing expansion in Brazil and Mexico in both 1972 and 1973 is spearheading this change in mix.

Expenditures by affiliates in *petroleum* increased 9 percent in 1972 and are expected to increase 11 percent this year, bringing total spending to \$5.8 billion. The growth in both years is due

Table 1.—Estimates of Plant and Equipment Expenditures by Foreign Affiliates of U.S. Corporations, Actual and Projected, by Percent Change and Amount

	Percent change								Billions of dollars								
	Actual				Current projection for: ¹		Prior projection for: ²		Actual				Current projection for: ¹		Prior projection for: ²		
	1968	1969	1970*	1971*	1972	1973	1972	1973	1967	1968	1969	1970*	1971*	1972	1973	1972	1973
Total.....	1	15	21	14	2	9	4	6	9.3	9.4	10.8	11.4	14.8	15.2	16.2	15.4	16.3
By industry																	
Mining and smelting.....	12	9	23	25	-24	3	-4	2	.9	1.8	1.1	1.4	1.7	1.3	1.4	1.7	1.7
Petroleum.....	10	19	4	20	9	11	10	18	3.0	8.3	2.6	3.5	4.8	6.2	5.8	5.2	4.6
Manufacturing.....	-7	19	30	8		4	3	0	4.5	4.2	6.0	6.5	8.5	7.1	7.2	6.9	8.0
Chemicals.....	0	-0	15	14	-2	3	-4	-6	1.2	1.2	1.1	1.3	1.5	1.4	1.5	1.4	1.3
Machinery.....	-7	22	42	6	10	2	0	3	1.1	1.0	1.5	1.9	2.0	2.3	2.2	2.2	2.6
Transportation equipment.....	-22	20	30	-16	7	0	11	-4	.8	.8	.8	1.1	.9	1.8	1.0	1.0	1.0
Other manufacturing.....	-6	27	30	9	0	8	-1	1	1.5	1.3	1.7	2.2	2.4	2.4	2.6	2.3	2.3
Other industries.....	3	23	30	11	7	13	7	11	.8	.8	1.0	1.4	1.5	1.6	1.8	1.0	1.8
By area																	
Canada.....	-5	10	17	8	8	8	0	7	2.3	2.1	2.3	2.7	3.0	3.2	3.2	2.2	3.5
Latin American Republics and other Western Hemisphere.....	20	12	4	-4	-1	4	6	8	1.8	1.6	1.8	1.9	1.9	1.9	2.6	1.9	2.0
Europe.....	-14	20	30	16	2	2	10	2	2.6	3.1	3.7	5.0	5.8	5.9	6.1	5.8	5.0
United Kingdom.....	-6	27	22	0	0	2	-14	8	1.0	.9	1.2	1.4	1.5	1.5	1.6	1.2	1.4
European Economic Community ³	-10	20	42	18	1	1	4	0	2.1	1.7	2.1	2.9	3.5	3.5	3.6	3.6	3.6
Other.....	-4	4	18	19	12	6	10	2	.5	.6	.5	.7	.8	.9	1.0	.9	.9
Australia, New Zealand, and South Africa.....	4	16	24	25	-20	6	5	-18	.7	.7	.8	1.0	1.3	1.6	1.0	1.3	1.2
Japan.....	20	6	39	39	-12	24	-8	23	.3	.4	.5	.6	.8	.7	.9	.8	1.0
Other areas.....	20	20	4	22	16	22	18	16	1.1	1.4	1.8	1.7	2.1	2.4	3.0	2.3	2.7
By OPDI schedule																	
All schedules ⁴	3	10	21	14	2	9	4	6	7.8	7.2	8.4	10.3	11.0	12.0	12.0	12.2	12.8
Schedule A.....	24	17	5	6	3	16	1	12	2.6	2.4	2.5	3.2	3.4	3.6	4.0	3.6	3.9
Schedule B.....	9	14	24	18	0	12	3	6	2.4	2.8	2.8	3.6	4.2	4.2	4.7	4.4	4.5
Schedule C.....	-16	18	34	10	4	-1	4	0	2.7	2.2	2.6	3.8	4.1	4.3	4.3	4.7	4.4

* Revised.

1. Based on results of the survey taken in December 1972.

2. Based on results of the survey taken in June 1972, as published in September 1972; no adjustments have been made to reflect information received subsequent to the publication.

3. Includes France, Germany, Italy, Netherlands, Belgium and Luxembourg only.

4. Does not include Canada.

Note.—Spending projections are adjusted in order to eliminate—or at least reduce—any systematic bias in response to the four surveys of estimated expenditures taken for each year (in June and December of the preceding year and June and December of the year in question, i.e., A, B, C, and D reports) before the final figures are available (the E report). The 1972

projection is based on the fourth estimate (D report) of spending for the year. The 1973 projection is based on the second estimate (B report) of spending for the year. For 1972 D and 1973 B, separately, the projections were derived by calculating ratios of actual spending (the final E estimate) to the reported expectation for each of the previous 4 years. No bias adjustment was made unless there was a deviation in the same direction in at least 4 of the 6 years. Also, no adjustment was made to items below \$10 million. When adjustment was necessary under these criteria, the median ratio of actual to expected spending in the 6-year period was applied as an adjustment factor. (For further discussion, see the Note on Methodology on page 31 of the September 1973 SURVEY.)

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Table 2.—Estimates of Plant and Equipment Expenditures by U.S. Corporations' Foreign Manufacturing Affiliates, by Selected Country—Summary of Surveys

(Millions of dollars)

	Actual					Projection ¹			Actual					Projection ¹	
	1967	1968	1969	1970*	1971*	1972	1973		1967	1968	1969	1970*	1971*	1972	1973
AR areas	4,625	4,194	4,376	4,432	6,857	7,068	7,379	Europe—Continued:							
Chemicals.....	1,210	1,208	1,118	1,270	1,407	1,431	1,478	Italy.....	150	165	181	271	293	380	389
Machinery.....	1,088	1,010	1,344	1,913	3,032	2,340	2,283	Chemicals.....	34	30	20	25	80	60	77
Transportation equipment.....	798	648	704	1,060	304	656	680	Machinery.....	66	74	90	153	158	210	206
Other manufacturing.....	1,432	1,899	1,710	2,291	2,439	2,438	2,900	Transportation equipment.....	2	2	4	5	18	16	20
Canada	1,001	654	1,038	1,149	1,494	1,324	1,384	Other manufacturing.....	48	50	67	79	66	70	71
Chemicals.....	186	158	150	150	109	203	257	Netherlands	108	147	204	228	245	180	202
Machinery.....	190	144	222	213	243	295	203	Chemicals.....	137	105	141	130	147	98	73
Transportation equipment.....	224	184	211	280	154	309	180	Machinery.....	38	39	35	43	61	52	76
Other manufacturing.....	411	858	434	474	827	620	818	Transportation equipment.....	2	1	1	2	4	2	6
Latin American Republics and other Western Hemisphere	586	674	611	648	668	632	590	Other manufacturing.....	21	15	26	38	44	37	47
Chemicals.....	150	170	108	170	173	308	308	Other	251	235	243	330	344	337	422
Machinery.....	78	80	85	140	170	180	175	Chemicals.....	83	100	69	83	99	81	81
Transportation equipment.....	88	60	104	111	89	181	201	Machinery.....	61	64	78	107	115	115	148
Other manufacturing.....	158	229	214	246	296	307	270	Transportation equipment.....	10	12	13	20	11	13	20
Argentina	100	71	05	138	113	79	97	Other manufacturing.....	08	60	83	120	119	128	179
Chemicals.....	80	15	14	15	14	16	12	Japan	194	227	268	374	485	487	435
Machinery.....	18	10	28	45	46	28	20	Chemicals.....	91	129	108	110	146	95	89
Transportation equipment.....	34	22	40	49	19	15	20	Machinery.....	64	45	90	173	235	255	249
Other manufacturing.....	18	16	18	20	26	20	22	Transportation equipment.....	2	3	2	3	3	2	2
Brazil	181	186	184	181	220	276	485	Other manufacturing.....	43	41	68	89	72	57	100
Chemicals.....	29	58	72	90	40	44	115	Australia, New Zealand, and South Africa	208	295	346	336	335	399	367
Machinery.....	35	40	50	86	70	94	303	Chemicals.....	47	66	80	44	22	55	57
Transportation equipment.....	24	51	35	31	47	131	132	Machinery.....	28	33	35	31	61	73	52
Other manufacturing.....	38	35	38	34	63	107	80	Transportation equipment.....	86	96	86	105	107	86	81
Mexico	133	181	170	204	186	216	265	Other manufacturing.....	05	101	120	183	196	185	167
Chemicals.....	66	70	68	61	74	95	110	Australia and New Zealand	214	244	264	335	328	370	289
Machinery.....	17	17	22	25	31	31	29	Chemicals.....	39	57	62	38	25	45	40
Transportation equipment.....	8	5	14	25	15	20	35	Machinery.....	23	28	30	42	53	68	46
Other manufacturing.....	48	80	76	60	64	64	80	Transportation equipment.....	76	78	90	98	94	70	64
Other	141	136	151	145	138	151	108	Other manufacturing.....	82	85	104	128	187	138	130
Chemicals.....	30	33	55	34	43	58	62	South Africa	42	50	42	62	67	80	68
Machinery.....	5	12	9	12	14	12	10	Chemicals.....	14	10	7	6	7	10	8
Transportation equipment.....	13	18	11	6	0	9	0	Machinery.....	6	4	6	0	0	7	6
Other manufacturing.....	90	78	80	78	79	76	82	Transportation equipment.....	18	10	6	7	13	18	17
Europe	2,332	2,012	2,329	2,573	3,934	3,834	3,949	Other manufacturing.....	13	17	24	40	30	47	37
Chemicals.....	634	534	483	661	871	711	668	Other Africa	31	18	14	31	46	41	78
Machinery.....	713	580	891	1,306	1,290	1,422	1,479	Chemicals.....	2	4	3	0	4	5	6
Transportation equipment.....	379	232	290	361	420	486	493	Machinery.....	1	1	2	4	3	2	3
Other manufacturing.....	604	566	764	1,062	1,214	1,200	1,299	Transportation equipment.....	1	1	1	1	1	1	1
United Kingdom	643	682	698	1,075	1,403	1,094	1,089	Other manufacturing.....	27	0	0	20	38	33	16
Chemicals.....	127	111	120	304	102	157	157	Middle East	62	111	73	127	68	67	49
Machinery.....	141	145	130	223	228	232	223	Chemicals.....	60	105	63	59	5	5	15
Transportation equipment.....	124	74	166	196	164	113	125	Machinery.....	1	1	2	3	2	1	1
Other manufacturing.....	251	240	238	482	390	402	463	Transportation equipment.....	11	7	8	74	80	45	33
European Economic Community²	1,438	1,105	1,440	2,188	2,407	2,980	2,439	Other Asia and Pacific	148	102	130	161	179	182	205
Chemicals.....	437	314	280	414	680	473	440	Chemicals.....	78	47	35	23	60	53	54
Machinery.....	810	466	639	968	1,040	1,075	1,113	Machinery.....	14	6	18	21	19	25	27
Transportation equipment.....	245	149	210	335	385	342	348	Transportation equipment.....	5	1	2	1	1	2	10
Other manufacturing.....	226	246	321	490	688	670	618	Other manufacturing.....	59	48	76	78	98	102	174
Belgium and Luxembourg	269	182	111	190	251	258	271	India	40	26	47	65	88	94	87
Chemicals.....	110	78	33	69	122	78	74	Chemicals.....	26	11	11	23	38	39	42
Machinery.....	48	42	30	35	46	76	100	Machinery.....	6	3	5	9	8	8	7
Transportation equipment.....	22	5	4	7	10	8	18	Transportation equipment.....	10	12	31	24	34	40	37
Other manufacturing.....	21	27	43	76	83	93	70	Other manufacturing.....	98	77	83	88	100	88	118
France	371	307	338	545	542	648	676	Other	50	38	24	20	31	14	11
Chemicals.....	50	28	30	35	29	58	63	Chemicals.....	8	5	13	12	11	17	20
Machinery.....	178	170	182	315	276	348	304	Machinery.....	5	5	13	1	1	2	10
Transportation equipment.....	76	32	41	54	73	95	60	Transportation equipment.....	30	25	45	44	57	58	77
Other manufacturing.....	70	68	75	110	140	146	145	Other manufacturing.....							
Germany	315	434	507	694	1,165	1,033	1,026								
Chemicals.....	96	84	65	128	212	182	174								
Machinery.....	184	160	273	400	421	380	416								
Transportation equipment.....	142	100	160	237	289	238	224								
Other manufacturing.....	95	88	110	160	233	233	212								

* Revised.
1. See note, table 1.

2. Includes France, Germany, Italy, Netherlands, Belgium, and Luxembourg only.
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

mainly to rapid expansion of exploration and production facilities in Saudi Arabia and growing investment in tanker fleets. Both factors reflect rapidly increasing worldwide energy needs.

Expenditures by petroleum affiliates in Canada rose last year while in Japan spending was cut back somewhat; in both countries, however, strong growth is expected in 1973. In Venezuela and Libya, expenditures declined in 1972 and are expected to fall further this year. Expenditures by European affiliates are

also expected to fall slightly following a 10-percent increase in 1972.

Following a 7-percent rise in spending last year, aggregate spending by affiliates in *other industries*—primarily agriculture, public utilities, trade, and services—is expected to rise 13 percent in 1973, the largest percentage increase among the four major industry groups. If realized, it will bring total spending to \$1.8 billion. Increases are scheduled in most major geographical areas, with a particularly large rise in Canada.

tries combined, and by major industry within each major area.

In the equations relating net capital outflows to plant and equipment expenditures, all but six of the regression coefficients are significant at the 1-percent level. (The coefficients for the four Canadian equations are not significant even at the 10-percent level.) Regression coefficients in the equations relating changes in the direct investment position to plant and equipment expenditures are all significant at the 1-percent level except for two that are significant at the 5-percent level.

While the equations for major industries and areas show strong relationships between the dependent and independent variables, the relationships are generally somewhat weaker than those obtained using global data. The relationships for major industries within each area are in turn usually still weaker. Disaggregation of these data resulted in series that are substantially more lumpy and discontinuous than the global data series. Evidently, the greater the disaggregation, the greater the importance of factors other than plant and equipment expenditures in determining direct investment.

Industry analysis

All three major industry equations relating net capital outflows to plant and equipment expenditures have regression coefficients significant at the 1-percent level. The strongest relationship is for industries other than petroleum and manufacturing ($R^2=0.79$) and the weakest is for manufacturing ($R^2=0.66$). (The Durbin-Watson statistic for the manufacturing equation indicates the presence of positive serial correlation. Serial correlation imparts an upward bias to the t ratio and increases the chance of accepting as significant a relationship that in fact is not statistically significant. The implications of this are discussed below.)

For a given change in plant and equipment expenditures, the largest associated change in net capital outflows is for industries other than petroleum and manufacturing; the regression coefficient (b) is 0.53. The next largest associated change in net capital

Plant and Equipment Expenditures and U.S. Direct Investment Abroad

THE remainder of this article discusses the relationship, by area and industry, between plant and equipment expenditures of U.S.-owned foreign affiliates and U.S. direct investment abroad. As was noted in the September 1972 SURVEY, where this relationship was examined on a global (all industries, all areas) basis, direct investment differs from plant and equipment expenditures in a number of ways. Direct investment is only one of several means of financing affiliates' plant and equipment spending; such spending may also be financed by affiliate borrowing abroad or by use of affiliates' depreciation reserves. Moreover, direct investment funds may be used for purposes other than to finance affiliates' plant and equipment expenditures, such as affiliates' working capital needs or the acquisition of new affiliates abroad by U.S. parent companies.

In the September SURVEY article, the results of two simple regression equations showed strong statistical relationships between annual plant and equipment expenditures (the independent variable in each equation) and both (1) annual net capital outflows for direct investment and (2) annual changes in the direct investment position of the United States excluding valuation adjustments (i.e., net capital outflows plus reinvested earnings of foreign affiliates). Those equations were

fitted to global data for the years 1957 through 1971. In this article, the work has been extended to include examination of the relationships between the same variables broken down by major area and industry. The same time period has been used. For the most part, neither study takes into account determinants of direct investment other than plant and equipment expenditures, including U.S. and foreign credit and profit rates and conditions in foreign exchange markets. However, the influence of the U.S. foreign direct investment control program is treated separately toward the end of this section.

The results presented in table 4 for major industries and geographic areas confirm the evidence of the global equations, i.e., that there is a strong relationship between affiliates' plant and equipment spending and both net capital outflows for direct investment and changes in the direct investment position. The equations are in the form $Y=a+bX$. The left half of table 4 presents results for equations relating annual net capital outflows (Y) to annual plant and equipment spending (X). The right half presents results for equations relating annual changes in the U.S. direct investment position (Y') to annual plant and equipment spending (X). Each half of the table shows results by major industry for all areas combined, by major area for all indus-

outflows is for petroleum ($b=0.36$) and the smallest is for manufacturing ($b=0.19$).

The manufacturing equation has by far the largest constant term (a)—the hypothetical value of the dependent variable (net capital outflows) were the independent variable (plant and equipment spending) to be zero. This means that at a very low level of plant and equipment spending the amount of associated capital outflow to foreign

affiliates would be larger in manufacturing than in petroleum or other industries. However, the regression line for manufacturing has such a shallow slope ($b=0.19$) that in the current range of plant and equipment spending the amount of net capital outflows per dollar of such spending is lower for manufacturing than for petroleum or other industries.

The high regression coefficient for industries other than manufacturing

and petroleum may reflect the fact that this category includes a significant number of affiliates engaged in services, such as trade and finance, rather than production. An increase in plant and equipment expenditures by such affiliates may be associated with an increase in other operations needing direct investment financing. For trading affiliates, for example, plant and equipment expansion may be accompanied by increased trade with their

Table 3.—Estimates of Plant and Equipment Expenditures by U.S. Corporations' Foreign Affiliates in the Petroleum, Mining, and Smelting, and Other Industries (Except Manufacturing)—Summary of Surveys

(Billions of dollars)

By area and major industry division	Actual					Projection ¹	
	1967	1968	1969	1970 [*]	1971 [*]	1972	1973
Petroleum							
All areas.....	3,901	3,311	3,646	3,792	4,766	5,178	5,749
Canada.....	636	645	629	724	746	806	918
Latin American Republics and Other Western Hemisphere.....	306	405	501	508	675	666	489
Venezuela.....	103	175	236	207	242	183	119
Other Latin American Republics.....	140	181	138	183	264	105	145
Other Western Hemisphere.....	55	85	125	119	160	204	224
Europe.....	1,045	851	878	875	1,322	1,450	1,417
United Kingdom.....	280	282	246	250	334	300	378
European Economic Community ²	682	401	472	646	734	802	783
Belgium and Luxembourg.....	101	71	91	71	128	66	88
France.....	61	62	86	107	131	200	213
Germany.....	251	100	154	128	188	246	210
Italy.....	93	88	111	184	206	193	175
Netherlands.....	77	82	91	74	81	90	110
Other.....	174	167	158	173	354	298	288
Japan.....	144	287	168	230	370	389	466
Australia, New Zealand, and South Africa.....	96	123	213	158	147	154	177
Other Africa.....	283	507	688	498	324	285	263
Middle East.....	191	185	154	141	255	654	787
Other Asia and Pacific.....	125	158	201	304	444	412	431
International shipping.....	24	184	319	313	586	623	583
Mining and Smelting³							
All areas.....	630	1,035	1,332	1,387	1,135	1,322	1,339
Canada.....	333	340	348	411	456	678	562
Latin American Republics and other Western Hemisphere.....	388	454	497	477	244	255	239
Europe.....	8	10	10	15	16	21	21
European Economic Community ²	8	3	3	3	3	4	4
Other.....	5	7	7	12	13	17	17
Australia, New Zealand, and South Africa.....	247	199	285	387	492	338	414
Other Areas.....	45	20	20	27	117	112	132
Other industries (except manufacturing)							
All areas.....	822	858	1,039	1,353	1,607	1,612	1,813
Canada.....	284	286	326	434	414	469	550
Latin American Republics and other Western Hemisphere.....	183	220	248	289	283	248	294
Europe.....	246	251	313	426	524	643	673
United Kingdom.....	56	42	52	60	119	177	133
European Economic Community ²	100	115	140	188	226	212	288
Other.....	90	90	112	158	191	253	284
Australia, New Zealand, and South Africa.....	43	33	43	78	82	77	85
Japan.....	8	9	11	8	17	27	38
Other areas.....	79	71	98	118	179	167	186

^{*} Revised.

¹ See note, table 1.

² Includes France, Germany, Italy, Netherlands, Belgium, and Luxembourg only.

³ There are no expenditures in the United Kingdom and Japan.

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

U.S. parent. This may raise the average level of payables due to the parent from the affiliates and thus increase net capital outflows on intercompany accounts, a component of direct investment. In addition, the limited fixed asset base of trading affiliates may make them less able to finance expansion by borrowing abroad and thus may increase the need for funds from their parent companies. For mining affiliates (also included in this category), which tend to be concentrated in underdeveloped countries with inadequate capital markets, borrowing abroad may also be difficult.

The relatively high regression coefficient for petroleum is to some extent a reflection of the concentration of branch (as opposed to incorporated)

affiliates in this industry. (Branches are prevalent also in the "other industries" category, but to a much lesser extent.) Current balance of payments methodology treats total earnings of foreign branches as being remitted to the United States; that portion which is actually left abroad and reinvested is treated as an offsetting net capital outflow from the United States in the same period. Thus, other things being equal, in industries (such as petroleum) in which branch operations are important, net capital outflows tend to be larger than in industries in which incorporated affiliates, whose reinvested earnings are not included in capital flows, are relatively more important.

In the industry equations relating the change in the direct investment position

to plant and equipment expenditures, the regression coefficients are again all significant at the 1-percent level and the Durbin-Watson statistics do not indicate the presence of serial correlation. As was to be expected, for each industry the change in the direct investment position associated with a given level of plant and equipment expenditures is larger than the net capital outflows associated with the same level of expenditures.

The regression coefficient for industries other than petroleum and manufacturing ($b=0.70$) is again by far the largest. Also taking into account the constant term, there are, in the current range of expenditures, larger changes in the direct investment position associated with a given level of

Table 4.—Regression Equations Relating Net Capital Outflows for Direct Investment and Annual Change in the U.S. Direct Investment Position to Plant and Equipment Expenditures of U.S.-Owned Foreign Affiliates; Annual Data, 1957-71

	$Y=a+bX$ Y=Net capital outflows for direct investment X=Plant and equipment expenditures						$Y'=a+b'X$ Y'=Annual change in the U.S. direct investment position X=Plant and equipment expenditures					
	a	b	t_b	R^2	D.W.	SEE	a	b	t_b	R^2	D.W.	SEE
Total.....	482	0.30	**10.28	0.88	**1.60	385	520	0.48	**15.56	0.95	**2.37	412
Petroleum.....	80	.36	**6.01	.72	**1.07	228	9	.45	**4.88	.60	**1.67	359
Manufacturing.....	311	.18	**5.31	.66	.95	261	311	.43	**6.90	.87	**2.16	301
Other industries.....	-30	.33	**7.29	.79	**1.73	193	289	.70	**6.35	.77	**1.75	270
Canada.....	204	.19	1.66	.11	**1.78	262	151	.53	**5.28	.46	**1.89	230
Petroleum.....	90	.11	.04	.00	**2.10	70	35	.40	**3.88	.47	**2.04	64
Manufacturing.....	-27	.34	1.71	.13	**1.71	158	69	.54	**4.04	.60	**2.32	130
Other industries.....	124	.21	1.37	.06	**1.39	117	189	.48	**2.10	.21	**1.13	162
Latin America.....	-271	.51	**3.85	.58	**1.46	212	-124	.64	**4.63	.60	**1.81	216
Petroleum.....	-371	1.07	**8.34	.87	**2.11	85	-269	1.17	**9.34	.87	**2.25	92
Manufacturing.....	60	.18	**5.35	.68	**1.65	47	79	.50	**6.40	.74	**1.89	54
Other industries.....	-51	.40	**4.05	.53	**2.57	81	71	.48	**3.07	.53	**2.57	82
Europe.....	271	.33	**6.61	.75	.97	286	377	.48	**9.36	.96	**1.33	280
Petroleum.....	-2	.66	**4.75	.61	**1.79	131	86	.40	**3.78	.31	**1.79	165
Manufacturing.....	178	.22	**5.06	.69	**1.54	161	252	.30	**6.30	.83	**2.25	175
Other industries.....	74	.61	**2.43	.30	**1.28	122	97	1.18	**2.90	.50	**1.18	145
Other areas.....	-17	.38	**10.34	.88	**2.68	154	117	.58	**13.41	.93	**2.03	161
Petroleum.....	23	.35	**5.17	.63	**2.34	134	17	.68	**5.96	.71	**2.89	106
Manufacturing.....	27	.19	**3.70	.40	**2.53	64	53	.40	**6.96	.77	**2.44	75
Other industries.....	-35	.65	**9.10	.86	.07	71	83	.70	**7.90	.81	**1.95	88

ADDENDUM:

Selected regression equations using FDI dummy variable

$$Y=a+bX+cD$$

Y=Net capital outflows for direct investment

X=Plant and equipment expenditures

D=FDI dummy variable¹

	a	b	t_b	c	t_c	R^2	D.W.	SEE
Total.....	126	0.37	**7.99	-593	1.92	.90	**2.42	368
Manufacturing.....	114	.30	**7.32	-590	**5.44	.82	**2.15	109
Latin America.....	-650	.01	**4.35	-413	*2.28	.82	**2.47	184
Europe.....	76	.47	**7.75	-821	*5.02	.95	**1.88	228

1. Excluding valuation adjustments.

2. The FDI dummy variable takes on a value of 1 for the years 1968-71; it takes on the value of zero for the years 1957-67.

Source: U.S. Department of Commerce, Bureau of Economic Analysis.

NOTE.— t_b is the t ratio of the regression coefficient; R^2 is the coefficient of determination corrected for degrees of freedom; D.W. is the Durbin-Watson statistic; SEE is the standard

error of the estimate corrected for degrees of freedom (measured in millions of dollars). In the addendum, t_c is the t ratio of the coefficient of the FDI dummy variable.

The symbols * and ** above the t ratios indicate that the regression coefficients are significantly different from zero at 5 percent and 1 percent confidence levels respectively.

The symbols * and ** above the Durbin-Watson statistics indicate that the null hypothesis of serial independence of the residuals cannot be rejected at the 1 percent or 5 percent level of significance. Tests of the Durbin-Watson statistic are based on the Theil-Nagar one-tailed testing procedure.

plant and equipment expenditures in this industry group than in petroleum and manufacturing.

The regression coefficients for petroleum and manufacturing are about the same (0.45 and 0.42, respectively). However, the constant term in the manufacturing equation is much larger than that in the petroleum equation (511 compared with 9) and is significant at the 1-percent level. Thus, the regression line for manufacturing lies above that for petroleum for the entire observed period. In other words, a given level of plant and equipment spending by manufacturing affiliates has been associated with a larger increase in the direct investment position than has been the case for petroleum affiliates. (Note that industry comparisons drawn from these equations are not distorted by the treatment of the reinvestment of branch earnings because the dependent variable in these equations is the sum of net capital outflows, including branch earnings that are reinvested, and reinvested earnings of incorporated affiliates.)

Area analysis

In the equations relating net capital outflows to plant and equipment expenditures by major area, three of the four regression coefficients are significant at the 1-percent level; the coefficient for Canada is not significant even at the 10-percent level. However, for the European equation, the Durbin-Watson statistic indicates the presence of serial correlation and implies that the significance of the regression coefficient may be overstated. The strongest statistical relationship between net capital outflows and expenditures is for the "other areas" category ($R^2=0.88$).

The largest regression coefficient—change in net capital outflows per dollar change in plant and equipment spending—is for affiliates in Latin America ($b=0.51$). However, also taking into account the constant term, for the current range of plant and equipment expenditures the highest level of associated net capital outflows is in Europe.

None of the regression coefficients in the four Canadian equations for

net capital outflows is significant, even at the 10-percent level. It is not clear why these equations are so weak, but the geographical closeness and strong integration of the U.S. and Canadian economies have evidently resulted in more volatile capital flows and disrupted the close relationship between net capital outflows and plant and equipment spending seen in other areas. The Canadian equations using changes in the direct investment position as the dependent variable are much stronger. Regression coefficients for the total, manufacturing, and petroleum are all significant at the 1-percent level. Evidently, compensating adjustments were made between capital flows and reinvested earnings in financing plant and equipment expenditures.

The equations for change in investment position for Latin America, Europe, and other areas have regression coefficients which are significant at the 1-percent level. As in the equations for net capital outflows, the strongest relationship is for affiliates in the "other areas" category ($R^2=0.93$). The European equation meets only the weaker of the two tests for the absence of serial correlation. The regression coefficients for the four major area equations are within a fairly narrow range, from 0.48 for Europe to 0.64 for Latin America. Also taking into account the constant term, in the range of current expenditures there is very little difference among areas in the relationship between a given amount of plant and equipment spending and the associated changes in the direct investment position.

The impact of the FDIP

Evidence of serial correlation, present in both European equations and in the manufacturing equation for net capital outflows, may imply that an important explanatory variable has been omitted. In an attempt to specify better the relationship between direct investment and plant and equipment expenditures, a dummy variable was introduced as a second explanatory variable to reflect the impact of the mandatory U.S. foreign direct investment program (FDIP). This program

was established in 1965 on a voluntary basis and was made mandatory in 1968. The FDIP was designed to reduce the impact of direct investment on the balance of payments through restricting the amount of such investment that could be financed with funds from the United States or with reinvested earnings that would otherwise be repatriated to U.S. parent companies. The restrictions have been tightest on transactions with affiliates in continental Western Europe and South Africa. The effect of these controls has been to encourage U.S. corporations or their affiliates to borrow funds abroad to finance direct investment. To the extent that parent companies borrowed abroad to offset their direct investment in response to the FDIP, net capital outflows and the change in direct investment position and their relationship to plant and equipment spending would be essentially the same as in the absence of controls. If, however, program requirements were met by affiliate borrowing, then both net capital outflows and the change in position would tend to be lower than in the absence of controls and their relationship to plant and equipment expenditures would be changed.

Among the major area, major industry, and global equations, the dummy variable was significant only in certain equations for capital outflows: at the 1-percent level only for manufacturing, at the 5-percent level for Europe and Latin America, and at the 10-percent level for the global total. After inclusion of the FDIP dummy, there was no longer indication of serial correlation in either of the area equations for Europe or in the net capital outflow equation for manufacturing.

These results seem to indicate that, in response to the FDIP, a significant amount of affiliate borrowing took place in Europe, where the mandatory controls were strictest. That the global manufacturing equation was also improved is somewhat more puzzling. While manufacturing investments are more heavily concentrated in Europe, the manufacturing equation for Europe showed no significant evidence of serial correlation without the FDIP dummy variable and that variable was sig-

nificant only at the 10-percent level when introduced. In the equation for Latin America, where controls were least strict, the dummy variable is more likely reflecting reductions in direct investment unrelated to the FDIP.

Concluding comments

It might be noted that actual direct investment net capital outflows totaled \$3.3 billion in 1972, substantially less than the \$4.9 billion suggested by the global equation. The reasons for the large difference are not yet clear, but part of it reflected the volatile exchange market conditions of 1971 and 1972.

In order to see how the various equations relate to each other, net capital outflows implied for 1973 were calculated in three ways using the current projections for 1973 plant and equipment spending: (1) The equation for all

areas and industries combined, (2) the sum of the major industry equations, and (3) the sum of the major area equations. The three approaches result in rather small differences in the predicted 1973 capital outflows. The global equation predicts a value of \$5.4 billion; the sum of the predicted values from the three major industry equations is \$5.5 billion; and the sum of the predicted values from the four major area equations is \$5.7 billion. Use of the equations for Europe and manufacturing which include the FDIP dummy variable results in no significant change in these predicted values. However, the recent change in exchange rates and the continued instability of exchange markets suggests that it would be inadvisable to predict net capital outflows for 1973 based only on their relation to expected plant and equipment expenditures.

markets in 1972 and the large amount of unused manufacturing capacity in Western Europe which reduced the need of foreign affiliates for new plant and equipment. Direct investment outflows to Latin American Republics and other Western Hemisphere countries totaled only \$0.1 billion, a decline of more than \$0.5 billion. Growing uncertainties about governmental policies regarding direct investment by foreigners may be discouraging U.S. direct investment outflows to these countries.

New issues of securities sold abroad by U.S. corporations increased \$0.8 billion to \$2.0 billion in 1972. This increase in new issues was partly related to the more favorable European credit market conditions compared to 1971. In addition, the recovery of the U.S. stock market made convertible issues more attractive to foreigners. Such bonds accounted for more than \$0.7 billion of the increase in new issues (table 6).

Other long-term corporate borrowing totaled \$0.6 billion in 1972, an increase of \$0.3 billion. A significant portion of this borrowing during the second half of 1972 was in Japan, marking the first time that Japan has been a major source of such funds. This reflects the easing of credit controls there over the past year. The heavy accumulation of dollars by the Japanese central bank and the Japanese monetary authorities' policy of depositing dollars in Japanese commercial banks resulted in attractive terms for U.S. corporate borrowers.

The favorable swing of \$0.4 billion in other corporate claims in 1972 resulted from the reduction of outflows associated with short-term, nonliquid claims. Most of the improvement in this largely trade-related account occurred in the first half of 1972 as foreigners reduced their accounts payable, which had increased throughout 1971, with exchange market uncertainties a contributing factor.

Balance of Payments

(Continued from page 50)

outflows and a \$1.1 billion increase in corporate borrowing abroad. Other corporate claims shifted favorably by \$0.4 billion.

Preliminary data indicate that direct investment outflows totaled \$3.3 billion in 1972, the smallest since 1969. The reduction of direct investment flows may partly reflect the small size of the increase in affiliates' plant and equipment spending (2 percent in 1972 compared to 14 percent in 1971; see the article on plant and equipment expenditures abroad beginning on page 45). Also, a portion of the large direct investment outflows in 1971 was probably associated with anticipations of the appreciation in many leading currencies against the dollar. Some of these funds

may have been used for regular direct investment purposes in 1972, thus reducing the need for additional outflows from the United States.

Direct investment capital outflows were \$0.9 billion in the fourth quarter. The \$0.3 billion decline from the third quarter reflected a shift to substantial inflows on intercompany accounts, suggesting that many companies engaged in year-end positioning even though it may not have been necessary to meet OFDI program requirements.

An area breakdown of direct investment outflows in 1972 shows two major shifts. Direct investment outflows to Western Europe declined \$0.8 billion to \$1.2 billion in 1972. This probably reflected the relatively calmer exchange